Microcomputer Newsletter

November 1985 Volume 2, Number 1

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The Fine Print:
The Microcomputer Newsletter is published by the University of Minnesota Computer Center Microcomputer Systems Group.

The Microcomputer Newsletter was produced on an Apple Macintosh running MacWrite, MacPaint, MacDraw, and Aldus Pagemaker software. The original was printed using the Apple LaserWriter and then duplicated.

NEWS: Micro Discount Program

• Hewlett-Packard Vectra

Hewlett-Packard (HP) has announced (and is now shipping) an IBM-AT compatible called the Vectra. The Bookcenter is offering the Vectra as part of the University's Microcomputer Discount Program. The Vectra has an 80286 CPU that runs at 8 MHz. The IBM-AT's 80286 CPU runs at 6 MHz. We ran a benchmark program that accesses memory frequency and found that the Vectra runs about 30% faster than the IBM-AT runs.

Machine	Run Time	Difference Relative to IBM AT
HP Vectra	13 seconds	+31%
Zenith Z-240	14 seconds	+26%
IBM AT	19 seconds	0%

Here are two representative HP configurations with discount program prices. Both configurations include a 12" monochrome monitor, multimode video adapter, serial/parallel interface, and Vectra Operating System.

•**HP Vectra Configuration #1:** 640K memory, 1.2 MByte capacity 5.25" floppy disk drive, 20 MByte internal hard disk: $3773.

•**HP Vectra Configuration #2:** 256K memory, two 360 KByte capacity 5.25" floppy disk drives: $2756.
Note that the Vectra does not come assembled. This means you must plug in video adapter cards, serial/parallel interface cards, and disk drives. You can have HP set-up your machine for $150. If you are interested in seeing a Vectra, stop by the Microcomputer Help Line.

•Mac Hard Disk, Imagewriter II, and Modem

Apple has officially announced a 20 MByte external hard disk for the Macintosh. We are supposed to receive a demonstration unit for the Microcomputer Help Line in November, and volume shipments are to start in late December or early January. The hard disk connects to the Macintosh through the external disk drive connector (where the external 3.5 inch floppy drive is currently connected). There is an external disk drive connector on the back of the hard disk, so if you already have an external 3.5 inch floppy drive, you can continue to use it. The performance of Apple's hard disk was impressive in the demonstration we saw; the speed seemed to be comparable to the HyperDrive hard disk. You can connect Apple's hard disk to any Macintosh with 512K (or greater) memory. As of the deadline for this issue of the newsletter, Apple had not yet given the University a price for the hard disk.

In addition to the hard disk for the Macintosh, Apple has two other new products: the Imagewriter II and the Apple Personal Modem. Imagewriter II enhancements include slightly higher print speed, an optional cut-sheet feeder, and a slot for adding expansion cards (such as a 32K print buffer). Alas, the buffer is of very limited utility on Imagewriters connected to the Macintosh because of the way the Macintosh uses the printer; the buffer is primarily aimed at Apple II owners. In the future, Apple plans to market a card that will allow you to connect the Imagewriter II to the AppleTalk local area network. The Imagewriter II is software-compatible with the old Imagewriter, so all existing software should work with the new Imagewriter. The Imagewriter II costs $435 through the discount program.

The Apple Personal Modem is a 300/1200 baud modem that comes in an unusual package. Instead of a box that sits on your desk, the Personal Modem is a compact unit that plugs into a wall power socket. The entire modem is not much larger than a calculator. The Personal Modem is software-compatible with Apple's old 300/1200 baud modem and costs $275 through the discount program. Incidentally, the bookstore is selling Apple's *old* 300 baud modems for $150 while supplies last.

• New 512K Macintosh Prices and Bundles

Apple has lowered the University's price for the 512K Mac and for the 512K memory expansion for 128K Macs. The 512K Macintosh now costs $1585. The 512K memory upgrade for 128K Macintosh now costs $420. Apple has announced new Mac bundles that are available through December 31, 1985. The three bundles come with MacWrite and MacPaint software. Here are the details:

•Back-to-School Bundle #1:
512K Macintosh, external disk drive, Imagewriter printer, carrying case, box of 10 diskettes: $2260.

•Back-to-School Bundle #2:
512K Macintosh, external disk drive, Imagewriter II printer, carrying case: $2282.

•Entry Bundle:
512K Macintosh, external disk drive, carrying case: $1875.

• No 128K Macs in the Discount Program

Apple has given us notice that it will no longer provide the University with the 128K Macintosh effective November 15, 1985. So, if you plan to buy a 128K Macintosh, you should do so as soon as possible. The 512K Mac will continue to be available through the University Discount Program.

PREVIEW: IBM PC Network

(Editor's note: This is not a full fledged ***Review*** *since we have not had our PC-NET installed long enough to really know the hardware and software. Because of the interest in local area networks for microcomputers, we are giving you our first impressions of PC-NET. Instead of a* ***Review****, we have a* ***Preview****. Look for a full-fledged review in a future issue.)*

Overview

The IBM PC Network (PC-NET) hardware and software can be used to connect a group of up to 72 PCs into a local area network. Machines in the network can share information and access to hardware. By using the network, hardware such as letter-quality printers and fixed disks, and software such as word processing and accounting applications, can be shared by users on the network. IBM's PC-NET also allows you to limit access to hardware and software available in the network, so that only some users are given access to certain files or devices.

The PC whose resources are being shared, is called a *Server* and the other PCs on the network are called *Remote* stations. More than one *Server* can co-exist on a network. The *Server* must be a PC-XT or a PC-AT. Since not everyone on the network will need all the functions available, the network program can be configured in four different ways (*Redirector*, *Receiver*, *Messenger*, and *Server*). Each configuration has a minimum hardware requirement that we will discuss later.

PC-NET Hardware

The PC-NET hardware consists of three major components:

- IBM PC Network Adapter Card
- IBM PC Network Translator Unit
- IBM PC Network cabling components

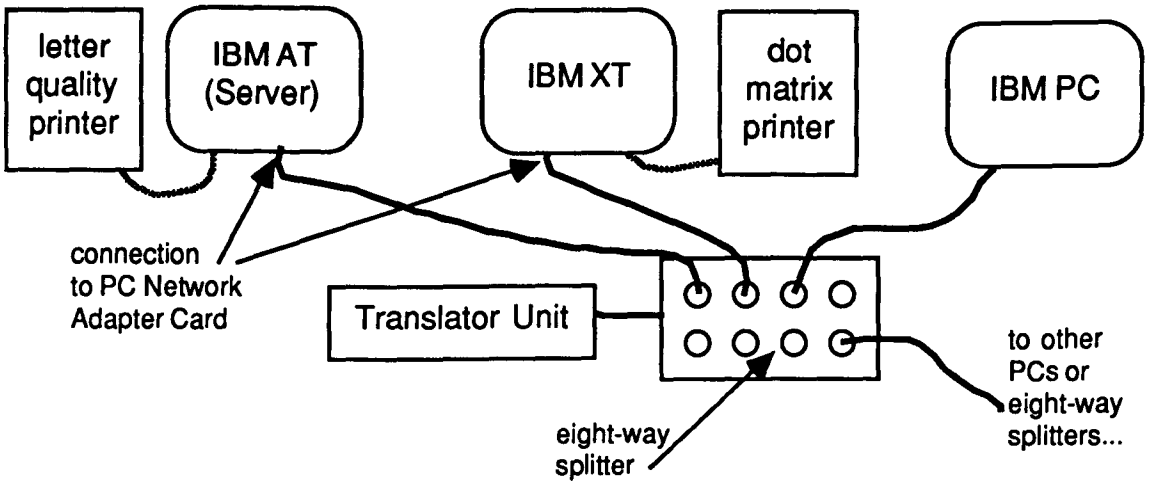
You must install an IBM PC Network Adapter card in each PC in the network. The Network Adapter plugs into an expansion slot of an IBM PC, IBM PC-XT, IBM PC-Portable, or IBM PC-AT. The IBM PC Network Adapter is not supported on the IBM PC-Jr. Cabling components connect each PC Network adapter card to the IBM PC Translator unit. (See the functional diagram on page 3.)

One Translator unit can have up to eight PCs attached to its eight-way splitter. If there are more than eight PCs in your network, you must purchase additional eight-way splitters and connect them to the eight-way splitter that comes with the Translator Unit. The Translator Unit is supplied with a separately packaged transformer that plugs into a standard electrical outlet and powers the unit. PCs must be within a radius of 200 feet of the splitter.

PC-NET Software

The IBM PC Network Program enables IBM PCs to be used in a local area network configuration. It allows you to share and use disks, directories, and printing devices on the network, transfer files, and send, receive, and log messages between machines.

A PC must have a fixed disk to act as a *Server* on the network. Any disk or directory can then be shared with other users on the network. Users accessing the information on the fixed disk can be given special access rights (read, write, create) and a password. Any user on the network can use any disk or directory made available to the network (subject to password and access restrictions). When a *Remote* user accesses a disk or directory on a Server PC, that disk or directory is treated as if it belonged to the Remote station. A Server can also share up to three print devices on the network. Each print device can be password-



protected. Print jobs are queued on a Server and printed as the print device becomes available.

There are three ways you can use the network's facilities. The first is the easiest. In this method you run the PC-NET program. The program presents you with a series of menus that require a single key response (you may enter a number or a letter for your specific selection). On-line help is also provided at this level.

The second method of interacting with the network is to enter network commands from PC-DOS. For example, you can use the NET SHARE command to let other computers use your device or directories or NET USE to specify a device or directory on a network computer that you want to use. This method is faster but prior knowledge of PC-DOS and Network commands is necessary. The third method of interacting with the network is for application developers. The PC Network Program and DOS 3.1 provide function calls that allow an application to perform network-related functions.

Installing the PC Network Program

Before you install the PC Network Program, you must decide which functions each PC should have. For each network, there should be a *Server PC*. The Server PC has the highest level of the network capabilities, and all functions of the Network Program are available to it. Other computers on the network can have more limited capabilities. A *Messenger PC* does everything that a Server does, but a Messenger can't share its resources among other network users. A *Receiver PC* lacks the full screen interface to the network functions that the Server and Messenger have. Receivers can only route messages to the screen, a printer, or a file while an application is running. A *Redirector PC* can only share a Server's disks and/or printers and send messages.

Because it is important to define the role of each PC on the network, someone in your office should be designated the network administrator. The network administrator should be in charge of setting up all the PCs and their function. Network administrators must learn PC-NET in detail so they can install and maintain the network. Network administrators should also document (write down) exactly what they have done with the network. It is important to have written documentation of how the network is configured so when the network adminstrator leaves, the new adminstrator has some clues about how things are configured, what the passwords and validations are, and so on.

Installing a Server PC

The Manual recommends using the Network Installation Aid (NIA) program to set up a Server PC. The Server must be installed before the Remote units are installed. Before starting the installation procedure, it is recommended that you make a list of all PCs connected to the network and assign a network name to each PC on the list. You should probably have a similar list for all the printers, disks, and directories set up to be shared.

Without a well thought-out directory structure, control of the network can be very difficult. The NIA program is set up to define a specific directory structure and a series of batch files that are helpful for organizing and learning the network. After studying batch files and the directory structure, you may want to organize your directories without the help of NIA.

After starting the NIA, you are presented with a menu of options. You should first install PC-DOS. At this point you are asked to choose a name for the Server. You then indicate a drive name for the Remote users to access your applications. The program will then install 'DOS'. Next you can install the *PC Network Program*. The last steps are to install the applications you need to use with the network and to name the Remote users. NIA doesn't support all applications. NIA provides a list of IBM software that can be installed at this point. Applications not included in this list must be installed manually. We were able to install WordStar on the server computer and access it from a remote PC. To do this, you should create a subdirectory under the \APPS subdirectory for the application. Use the PC-DOS COPY command and copy all the files to that directory.

Installing a Remote PC

You install the PC Network Program on a remote user's fixed disk or diskette by using the batch file named INSTALL.BAT on the PC Network Program diskette. This can also be done by the Server if the NIA is not used. INSTALL.BAT creates a CONFIG.SYS file and a subdirectory named NETWORK that contains the PC Network Program. If you already have a CONFIG.SYS file, the network program alters your file to have additional commands needed by the PC Network. The CONFIG.SYS file contains special commands that tailor the way that you want to use your computer's memory with DOS. If you normally use a CONFIG.SYS file, you may want to edit the

CONFIG.SYS file that the PC Network Program installs, so that the new file includes the additional information from your normally used CONFIG.SYS file.

Hardware and Software Prerequisites

The minimum configuration for a computer that is a Server on the network is different from a Remote computer. The PC that is used as a Server requires one fixed disk drive, one double-sided diskette drive, 256KB of memory, an IBM PC Network Adapter, an IBM compatible print device, and PC-DOS 3.1. The Remote computer requires one double-sided diskette drive, at least 128KB of memory, an IBM PC Network Adapter, and PC-DOS 3.1.

IBM PC Network Program Manual

We recommend that you study the first six chapters before using PC-NET. This will give you a general knowledge of how the program works and what you need to prepare prior to the installation procedure. Chapters seven, eight, and nine give a complete description of the Network Commands. The rest of the manual is dedicated to explaining the management of the computers on the network. This manual is aimed at individuals familiar with technical manuals and the IBM computers. We found, while installing the program, that in many cases it was easier to use on-line help than to use the manual.

Conclusion

We set up three computers on our network and were able to access the Server's fixed disk and directories and to access files. We used the NIA program to install the Server and do recommend using the program. NIA provides a list of the IBM applications that can be installed on the network. You can select and install any of these programs. You may also add other applications after you have installed the network, providing you install the applications in the correct directory.

After installing the network, you have the option of saving your selections in an AUTOEXEC.BAT file. This file saves a copy of all the tasks you did to set up your computer on the network. This file is then executed each time you boot your machine.You will see a prompt asking you if you want to start the network. If you choose to start the network, the tasks you saved are executed and your computer is automatically set up on the network. If you already have an AUTOEXEC.BAT file, your file is renamed to AUTOUSER.BAT and is executed after AUTOEXEC.BAT.

If you have just purchased IBM computers for your office, and are not familiar with the IBM computers or the PC-DOS operating system, we do not recommend trying to use PC-NET immediately. The IBM PC Network is a complicated piece of hardware and software and requires a knowledgeable person to set it up. The IBM PC Network is relatively expensive (it costs around $700 per microcomputer to connect a micro to the network). We suggest that you make certain that the network will really do what you want before you purchase it. We frequently talk to individuals who would like to maintain a database that can be simultaneously accessed by all the microcomputers in their office. While the PC Network hardware makes this *theoretically* possible, we have not yet seen any software that allows multiple access to a single database. Since the price of microcomputer hardware continues to decline, it would probably be wise to defer hardware purchase until software becomes available that can take advantage of the network.

Another issue that is unresolved at this point is licensing software for network use. One reason for buying a network is to share software. But most software licenses forbid placing software on a network server, so sharing software on a network may leave you open to legal action. Hopefully, software that is written to take advantage of local area networks will become available soon, and the software vendors will begin to address the issue of network licenses for software. We will keep you posted as more information becomes available.

REVIEW: Power-base

Overview

Power-base is a versatile data base management package for IBM PC, XT, AT, and compatibles. Power-base requires 320K of memory and two disk drives. Preferably one drive is a hard disk to increase execution speed and to avoid disk swapping. You are also given directions for setting up Power-base on one high-density floppy disk for the IBM AT.

When you install the program for your display monitor, you are presented with eight different options with a sample of how each option will look on your screen. You just select the one that looks best. At the lab we have Power-base running on monochrome monitors with both IBM monochrome and Paradise Graphics boards, and on a composite video monitor connected to an IBM color/graphics display adapter. It works fine on all of them. You can have two printers defined and can select which one to use when printing. They can be two different printers or one printer in two different modes (e.g., regular for 80 columns and compressed for 132 columns). Power-base is not copy-protected. In fact, instructions for installing it on your equipment include an injunction to make back-up copies. They even provide pre-printed labels for all your backup disks.

Manual

The manual is very well-written and is generous in providing examples of screen displays. Explanations are clear and thorough, and the authors frequently offer suggestions for how to apply a function in other types of applications. The over-all tone is informal, but informative. The manual includes an extensive tutorial section that is accompanied by sample files on the tutorial disk. Each of the ten lessons focuses on a specific function of the program, such as entering data or writing reports. You are first lead through their sample, with thorough explanations of why and how things are done. You are then coached to repeat the lesson using an identical file you have created. At the end of each lesson you really feel like you could go off on your own and do the same thing with your own data base application.

Data entry

Power-base is a menu-driven program. This means that you enter

commands by selecting from among a row of options which appears across the bottom of the screen. Thus, you never have to memorize commands; you just have to know what you want to do next.

You can think of a data base as a set of electronically-stored file cards. If your data base holds student records, each card would contain the record for a single student. The cards would contain the same fields of information: ID number, name, local address, permanent address, college, major, GPA, expected date of graduation, and unpaid library fines. A computerized data base uses the same format: a collection of records, each containing the same fields of information. However, a computer uses the screen instead of a file card. Part of Power-base's strengths are its power, flexibility, and extreme ease in setting up a data entry screen. For each field, among other attributes, you can enter a prompt of up to 40 characters in length; define the field's type (alphanumeric, number, dollar, date, or yes/no); specify if the field must have a unique value (such as a unique ID number); and assign a minimum and maximum value (no GPAs less then 0). You can also type in one line of help for any of the fields. Thus, in addition to the prompt, you can give the user specific information about what to enter.

Data can also enter a field automatically from another file. For example, you might have a separate file of Library Dead-Beats. As soon as the user enters the student's ID number, Power-base can look up the number in the *Library Dead-Beat* file and, if the number is there, enter the amount of the fine in the appropriate field on the screen.

Reports

In addition to just listing information on the screen, you will probably want to print reports. The Report facility allows you to create quality documents with a minimum of fuss. You can select records and fields, and also headers, footers, subtotals, totals, and general layout. One of the tutorial lessons is devoted to report-writing, and presents a very complete and detailed sample report.

Labels

Power-base has a separate function for printing mailing labels. You enter how big the labels are, how many in a row, and how much space between them. Power-base then displays an outline of the label on the screen for you to fill in with fields. This is how you can adjust the placement of fields so they all fit within the boundaries of the label.

Power-base is very clever in printing labels. Suppose your file has a city and state in separate fields, and the city name has been allocated 15 spaces. Now suppose you want to print an address in Ames, Iowa. Instead of appearing as Ames , Iowa, all unused spaces at the end of a field are trimmed so that the state is printed right after the city. The same thing occurs if you have first and last names in separate fields. This feature alone is a real boon to those maintaining mailing list data bases.

Other Features

Power-base can read and write files compatible with WordStar, dBASE II, Lotus 123 and Symphony, Multiplan, Multimate, pfs:file, and any other programs that support ASCII, DIF, SYLB WKS, PRN and IMP formats. In addition to the tutorial, you receive three ready-to-run applications: the Electronic Phone Directory, the Stock Tracking System, and the Project Management System. When you send in your registration card, you can select two more applications from a list of eight applications.

What About dBASE II/III?

Both dBASE and Power-base are excellent programs, but intended for different kinds of users. Power-base is an interactive package; the end user must know how to use it. As an interactive package it is extremely powerful, flexible, easy to learn, and easy to use. But there is no programming language in Power-base so nothing can be automated. If you must prepare monthly reports for all the budgets in your department, you have to go through the same steps each month. While the forms of the reports can be saved on files, you must select the data files to work with, choose each report form, and re-select the columns and rows you want to have included. dBASE is comparatively weak interactively, but it has a sophisticated programming language that enables you to automate repeated operations. Once the monthly report program has been written, all you have to do is type DO REPORT whenever you need it.

An advantage of a programming language is that it provides much more flexibility. dBASE allows you to set up the data base files, then gives you total control in how to manage the files. But freedom can have its drawbacks. Programming in dBASE is not a trivial matter. You must be familiar with programming concepts as well as the specifics of the dBASE language. It could easily take hours to produce the same data entry screen in dBASE that you could produce in minutes with Power-base. Another consideration is *who is going to be working with the data base?* With Power-base, the user must be familiar with the package. With dBASE, a program could be written by a programmer so that the end user can run it without knowing anything at all about dBASE.

In summary, if you want automation, if you want a data base system that can be managed by relatively untrained users, *and* either enjoy programming or know someone else who does, dBASE II or III would be a good choice. If you are going to be using the system yourself and want something flexible, powerful, and easy to use on an interactive level, then Power-base would be a good choice.

Power-base is an excellent interactive data base management system. It comes with a fine manual, a thorough tutorial, and several sophisticated applications you can study or modify for your own use. In addition to its power I'd like to stress how much fun I had working with Power-base. I readily mastered even some of the more complex tasks like linking files and look-up tables. The basics in the tutorial take you a long way, and you can move into advanced features and learn shortcuts quickly. I recommmend Power-base highly to those who want an interactive data base manager. Power-base is available at the Minnesota Bookcenter for $357.

REVIEW: SciFonts

Overview

SciFonts for the Macintosh is one of Paragon Courseware's technical font sets. We were interested in it because SciFonts' advertisement said it has "three levels of subscripting and three of superscripting."

What we got was four ImageWriter fonts: a Cursive font, a SuperScientific font, a SubScientific font, and a Scientific font. The Scientific, SuperScientific, and SubScientific fonts come in 9, 10, 12, 18, 20, and 24 point sizes and include mathematical symbols and the full Greek Alphabet. The Cursive font only comes in 12 and 24 point. We also got a small manual and keyboard layout.

Using SciFonts

We were disappointed that SciFonts did not add super-superscript and sub-subscript options to MacWrite's **Style** menu. Instead, SciFonts gives you two fonts whose characters are smaller than its Scientific font's characters. These are the SuperScientific and SubScientific fonts.

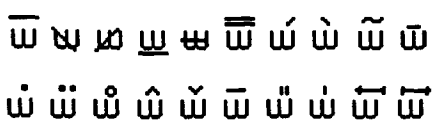
With SciFonts you can get superscript and subscript characters in two ways. One method is to choose the superscript or subscript options from MacWrite's **Style** or Microsoft Word's **Character** menu. The other way to superscript or subscript characters is to choose the SuperScientific or SubScientific font.

You can get a second level of superscript or subscript characters in *one* way. Use the SuperScientific or SubScientific fonts and choose the superscript or subscript options from MacWrite's **Style** or Microsoft Word's **Character** menu. The 12345 example below shows these two levels of super-and subscript. We don't like the way the third level of superscript and subscript characters look in the 1234567 example. Both examples were typed as one line. Although the top of SciFonts' super-superscript characters, like the *3* and *4* , are clipped on the screen, they are not clipped on the printed copy.

SciFonts lets you fine tune the space between characters or words. That is, if you press the **option** key and the **space bar** simultaneously, you get a space which is one dot (one pixel) wide. You can string these micro-spaces together to create whatever spacing you want. MacWrite and Microsoft Word do not recognize this micro-space as ending a word. Because of this, neither MacWrite nor Microsoft Word broke our equation onto separate lines.

We tried some of SciFonts' building block characters. We couldn't create a good looking curly bracketed {} equation that spanned more than one line. The curl at the top and bottom of each bracket doesn't mesh with | and other building block characters.

SciFonts gives you characters that can overstrike any character in the three scientific fonts. But beware: we found some combinations look better than others. In the sample below we used *w* and SciFonts' 21 overstrike characters.



The SciFonts are Imagewriter fonts and, therefore, look better printed on the Imagewriter than on the LaserWriter. The overstrike and other characters aligned on the Imagewriter as they are aligned on the MacWrite screen. However, these characters are not always aligned on the LaserWriter as they are on the MacWrite screen.

Some software and fonts won't work with SciFonts. For example, we tried SciFonts with the Princeton font because many Macintosh users at the University of Minnesota use the Princeton font. We had no trouble mixing the SciFonts and Princeton in MacWrite and Microsoft Word documents. (Incidentally, Princeton is a public domain font. You can get a free copy of Princeton at the Microcomputer Help Line.) We also tried using SciFonts with Aldus PageMaker, but we couldn't print SciFonts on the LaserWriter. (We use PageMaker to mark-up pages for this newsletter.) The SciFonts samples with this article are MacPaint images that were pasted into PageMaker.

Conclusion

Despite the problems listed above, if you want an ImageWriter font with more than one super-and subscript level, SciFonts Version 2.0 may interest you. Stop by the lab if you want to try it. SciFonts is $49.95 from Paragon Courseware, 4954 Sun Valley Rd, Del Mar, CA 92014. Their phone number is (619) 481-1477.

ANNOUNCEMENTS:

• New Microcomputer Lab

A new microcomputer lab is now open in room 306B Lind Hall on the Minneapolis East Bank campus. The lab has 25 IBM PCs and six Epson MX-80 dot matrix printers. Hours are 8:00 AM to 10:00 PM Monday-Friday, and 10:00 AM to 6:00 PM Saturday. To use the lab, you must purchase a *Microcomputer Lab Access Card*. An access card costs $20 per quarter and allows you to use the microcomputer labs managed by the Information Systems department. These labs are: 167 Social Science Tower; St. Paul Campus Library room B50; 14 Folwell Hall; and 148 Architecture. You can purchase access cards from the Williamson Hall Bursar, the St. Paul Bursar, and the West Bank Bursar.

• IBM Software Upgrades

We have upgrade order forms for several IBM products. The forms, when accompanied by proof-of-purchase of an earlier version of the software, can be used to order the current version of the software. IBM defines proof-of-purchase as the original cover page from the manual that comes with the software.

The software upgrades are available for a limited time only. Stop by the Microcomputer Help Line if you need to pick up a copy of an upgrade form. We have forms for the following upgrades:

Product	Cost	Deadline
DOS 3.1 Technical Reference	$ 65	Dec. 31, 1985
IBM BASIC Compiler 2.0	$195	Mar. 31, 1986
DOS 3.1	$ 30	Dec. 31, 1985
IBM Displaywrite 2	$ 50	Nov. 11, 1985

ADVICE: Ask Dr. Micro

Q: How can I be certain I get my software updated when a new version is released?
A: When you purchase your software, you should fill out the software registration card. (The registration card is generally packaged with the manual.) By filling out and returning the owner registration card, you make it possible for the people who wrote the software to notify you when new releases of your program become available. Most software houses send notices to all registered owners whenever a new release of the software is completed. One of the joys of owning a microcomputer is that you have complete responsibilty for keeping your software current.

Another good reason for returning registration cards is that you are in a much better position to request replacement disks from the software manufacturer if one of your disks fails. Suppose you buy a piece of software that is copy-protected. You are unable to make a back-up copy of the disk and something happens (your dog eats the disk) to your only copy of the master disk. Most software houses are happy to replace damaged diskettes (for a nominal charge) if you have returned your registration card. If you have not returned the registration card, the vendors are not inclined to help you. Dr. Micro strongly suggests that you complete and return all software registration cards.

Q: I'm having a very hard time getting things to line up when I print them on the Apple Laserwriter. For example, if I type a list in two columns, the words in the list don't line up exactly when I print the document, but things look fine on the screen. There must be some way to get straight columns. What is it?
A: Usually, when we hear about a problem with lining up things on the LaserWriter the problem can be solved by using *tabs* rather than *spaces* to align the columns. Here is what to do: set a tab-stop on the ruler in MacWrite to mark the position where you want the column to start. Press the *tab* key to move to the tab-stop position, then type in the information for the column. The trick is to use tabs instead of spaces to position the cursor at the beginning of a column.

For those who want to know why tabs work better than spaces, here are the details: The Macintosh screen has a resolution of about 75 dots per inch. The LaserWriter resolution is 300 dots per inch. Because the Macintosh does not have the high resolution of the LaserWriter, it isn't possible to display a perfect representation of what the LaserWriter will print on the Macintosh screen. The best the Mac can do is display an *approximation* of what will be printed. When you use a *tab* to align a column, the exact location of the tab is sent to the LaserWriter and the column is straight. When you use *spaces* to align a column, you are looking at an approximation of what will be printed and you are aligning the columns by eye. Since the screen display is not faithfully representing what will be printed, it is nearly impossible to make columns line up exactly by using spaces. This problem usually does not come up when printing to the Apple Imagewriter because the Imagewriter has a resolution of 75 dot per inch (the same as the Macintosh screen). What you see *is* what you get when you print on the Imagewriter. What you see is *approximately* what you get when you print on the LaserWriter.

Another factor contributing to the difficulties of producing straight columns is the fonts on the Macintosh. With the exception of the Monaco and Courier fonts, all other Macintosh fonts are proportional-width. Proportional-width fonts are fonts that have characters of different widths; the letter "W" is wider than the letter "I". The Monaco and Courier fonts are fixed-width fonts; all letters are the same width. While proportional fonts generally look better than fixed width fonts, there is a drawback to proportional fonts: you cannot depend on a fixed number of characters covering the same width on the page. Here are two words that are two characters long but one word is much wider than the other:

we
it

If you use spaces to align columns, the variable-width characters will make it impossible to align a column exactly, because you start from different positions on the page depending on which letters are on the line. Here is an example:

we I
it I
he I

Again, the solution is to use tabs rather than spaces to align columns.

If you are not now on our mailing list, complete this coupon and return it to us.

Microcomputer Newsletter Mailing List

name _____

address _____

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